ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	DORMA Deutschland GmbH
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-DOR-20140193-CBC1-EN
Issue date	28.10.2014
Valid to	27.10.2019

M9000 Series Mortise Locks

DORMA

Institut Bauen und Umwelt e.V.

www.bau-umwelt.com / https://epd-online.com

General Information

DORMA

Programme holder

IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number

EPD-DOR-20140193-CBC1-EN

This Declaration is based on the Product Category Rules:

Locks and fittings , 07.2014
(PCR tested and approved by the independent expert committee)

Issue date

28.10.2014

Valid to

27.10.2019

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Dr. Burkhart Lehmann
(Managing Director IBU)

M9000 Series Mortise Locks

Owner of the Declaration

DORMA Deutschland GmbH
DORMA Platz 1
58256 Ennepetal
Germany

Declared product / Declared unit

The declaration represents one lock unit.

Scope:

The declaration and the background LCA represent DORMA's M9000 Series mortise locks. Raw materials and components are provided by suppliers and shipped to DORMA, where the locks are assembled at DORMA's Reamstown, PA facility. The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Verification

The CEN Norm EN 15804 serves as the core PCR
Independent verification of the declaration according to ISO 14025
☐ internally ☒ externally

Dr.-Ing. Wolfram Trinius
(Independent tester appointed by SVA)

Product

Product description

DORMA's M9000 Series mortise locks are versatile, heavy-duty locksets that provide exceptional security, enhanced aesthetics, and rugged dependability. These locks are available in a range of lever and knob trim designs. The M9000 Series features more than 40 functions, including functions with optional deadbolt for security and single motion egress to meet code requirements.

Application

The M9000 Series is suitable for a wide range of applications. It is best suited for high use commercial applications such as schools, government buildings, municipal buildings, offices, and more.

Technical Data

The M9000 Series are non-handed locks that are suitable for door thicknesses from 1.75 to 2.25 inches. A stainless steel deadbolt with hardened steel roller pins imparts strength, durability, and saw resistance, while a full length interlocking face plate supports both the latch and deadbolts against forced entry.

Certifications include /ANSI A156.13/ Series 1000, operational and security Grade 1; /ANSI A117.1/; and /UL 10C/.

Base materials / Ancillary materials

Name	Value	Unit
Steel	61	%
Brass	38	%
Zinc	1	%

Reference service life

No use stage modules are reported; as such, declaration of the reference service life (RSL) is voluntary. The RSL is not reported for the M9000 Series locks.

LCA: Calculation rules

Declared Unit
The declared unit of this analysis is one mortise lock.

Declared unit

Name	Value	Unit
Declared unit (1 lock)	1	1 piece/product
Mass of system (without packaging)	2.4	kg
Conversion factor to 1 kg	0.42	-

System boundary
Type of EPD: cradle-to-gate - with options. The following modules were considered in the analysis:

Product stage:
- Raw material supply (A1)
- Inbound transport (A2)
- Manufacturing (A3)

Construction process stage:
- Distribution (A4)
- Installation (A5)

End-of-life stage:
- Disposal (C4)

Beyond system boundaries:
- Reuse, recovery, recycling potential (D)

Comparability
Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

LCA: Scenarios and additional technical information

Additional information is provided for declared modules, including A4, A5, C4, and D. In order to represent DORMA's global distribution network, a sales-weighted average is used to model transport to the building site. The table for Module A4 shows both weighted average transportation distance (given regional mortise lock sales), which is used in the analysis, along with the variation in that distance. Additionally, estimated global average recycling rates are used to represent product disposal.

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel (truck)	31	l/100km
Fuel economy (truck)	7.6	mpg
Transport distance (SI)	2400 - 22800	km
Average transport distance (SI)	6,000	km
Transport distance (imperial)	1,500 - 14,200	mi
Average transport distance (imperial)	3,750	mi
Capacity utilisation (including empty runs)	85	%

Installation into the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (packaging)	0.32	kg

End of life (C1-C4)

Name	Value	Unit
Recycling	1.8	kg
Landfilling	0.64	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Name	Value	Unit
Recycling rate, brass	52	%
Recycling rate, paper	90	%
Recycling rate, steel	88	%
Recycling rate, zinc	52	%

LCA: Results

The table below summarizes which modules are declared (as indicated by an "X"), and which are not declared (as indicated with "MND"). Environmental performance results are shown for one (1) mortise lock.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARYS
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement[1)]	Refurbishment[1)]	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse- Recovery- Recycling- potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 lock (2.4kg)*

Parameter	Unit	A1 - A3	A4	A5	C4	D
Global warming potential	[kg CO_2-Eq.]	9.305E+0	3.580E-1	6.670E-2	2.870E-2	-1.710E+0
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	3.051E-8	2.020E-12	3.910E-14	5.990E-13	2.290E-8
Acidification potential of land and water	[kg SO_2-Eq.]	4.902E-2	5.560E-3	7.690E-5	1.300E-4	8.130E-4
Eutrophication potential	[kg $(PO_4)^{3-}$- Eq.]	3.817E-3	6.820E-4	3.440E-5	1.520E-5	-6.930E-4
Formation potential of tropospheric ozone photochemical oxidants	[kg Ethen Eq.]	2.946E-3	-2.680E-5	2.310E-5	1.270E-5	-7.270E-4
Abiotic depletion potential for non fossil resources	[kg Sb Eq.]	1.201E-3	1.270E-8	7.330E-10	1.120E-8	6.460E-4
Abiotic depletion potential for fossil resources	[MJ]	1.178E+2	4.660E+0	2.860E-2	4.390E-1	-2.050E+1

RESULTS OF THE LCA - RESOURCE USE: 1 lock (2.4kg)*

Parameter	Unit	A1 - A3	A4	A5	C4	D
Renewable primary energy as energy carrier	[MJ]	8.406E+0	1.160E-1	1.360E-3	2.090E-2	2.030E+0
Renewable primary energy resources as material utilization	[MJ]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Total use of renewable primary energy resources	[MJ]	8.406E+0	1.160E-1	1.360E-3	2.090E-2	2.030E+0
Non renewable primary energy as energy carrier	[MJ]	1.339E+2	5.020E+0	3.190E-2	4.890E-1	-2.020E+1
Non renewable primary energy as material utilization	[MJ]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Total use of non renewable primary energy resources	[MJ]	1.339E+2	5.020E+0	3.190E-2	4.890E-1	-2.020E+1
Use of secondary material	[kg]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Use of renewable secondary fuels	[MJ]	-6.166E-3	3.230E-5	3.260E-5	5.000E-4	4.780E-4
Use of non renewable secondary fuels	[MJ]	-6.671E-2	3.390E-4	7.440E-5	1.140E-3	3.560E-3
Use of net fresh water	[m^3]	2.254E+1	9.650E-2	-8.640E-2	-1.390E+0	1.920E+1

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 lock (2.4kg)*

Parameter	Unit	A1 - A3	A4	A5	C4	D
Hazardous waste disposed	[kg]	3.875E-3	1.030E-5	7.360E-7	1.130E-5	-6.890E-5
Non hazardous waste disposed	[kg]	6.480E-1	3.660E-4	3.100E-2	6.340E-1	5.290E-1
Radioactive waste disposed	[kg]	2.906E-3	7.930E-6	3.670E-7	5.620E-6	4.040E-4
Components for re-use	[kg]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Materials for recycling	[kg]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Materials for energy recovery	[kg]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Exported electrical energy	[MJ]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Exported thermal energy	[MJ]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0

* 1kg = 2.204 lbs.

Mortise lock environmental impacts are dominated by the product stage (A1-A3) for all impact categories. The production of raw materials such as steel and brass, in particular, are key drivers of environmental performance. One exception, however, is ozone depletion potential, for which Module D accounts for a significant portion of environmental impact. This is due to differences in primary versus secondary steel production routes, the latter typically leading to higher ozone-depleting emissions from electricity use in electric arc furnaces.

Distribution also accounts for a relevant contribution in a few impact categories. Compared to the product stage, however, distribution is a smaller fraction of mortise lock environmental impact. Distribution is modeled assuming a sales-weighted average based on the countries and regions in which locks are sold. Finished products are shipped from DORMA's facility in Reamstown, PA to various locations in Eurasia and the Americas. While the results represent DORMA's specific situation as of 2013, they can be reevaluated for a specific country or region.

At the end-of-life, DORMA's locks are modeled as being recycled. A portion of each material type is recovered and the remainder landfilled. In this case, proxy data are used as often, global average or even regional specific data are not available. Waste disposal (Module C4) is consistently a minor contributor to environmental impact so dataset choice is not anticipated to affect conclusions.

References

Institut Bauen und Umwelt
Institut Bauen und Umwelt e.V., Berlin (pub.): Generation of Environmental Product Declarations (EPDs);

ISO 14025
DIN EN ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

EN 15804
EN 15804:2012-04+A1 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

ANSI A117.1
ANSI A117.1 - 2009, Accessible and usable buildings and facilities

ANSI A156.13
ANSI/BHMA A156.13 - 2012, Mortise locks

GaBi 6
PE INTERNATIONAL; GaBi 6: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Echterdingen, 1992-2013.

GaBi 6 Documentation
GaBi 6: Documentation of GaBi 6: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Echterdingen, 1992-2013. http://documentation.gabi-software.com/

ISO 14040
EN ISO 14040:2006, Environmental management — Life cycle assessment — Principles and framework

ISO 14044
EN ISO 14044:2006 Environmental management — Life cycle assessment — Requirements and guidelines

PCR Part A
Institut Bauen und Umwelt e.V., Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. 2013. www.bau-umwelt.com

PCR Part B
PCR Guidance-Texts for Building-Related Products and Services. From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU). Part B: Requirements on the EPD for Locks and fittings. 2012. www.bau-umwelt.com

UL 10C
UL 10C, Positive pressure fire tests of door assemblies

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